



## **DRPT Accident Investigation Procedure**

### **1 Initiation of Investigation**

Using the investigation threshold requirements described previously in this standard, DRPT determines if an investigation is required, and whether it will conduct an independent investigation.

If an investigation is required, DRPT will designate an investigator in charge to conduct the investigation in accordance with the procedures outlined in this standard.

### **2 Initial DRPT Response**

#### **2.1 Incident command**

Upon notification of an event that meets the necessary threshold, DRPT personnel will communicate with the RTA's on-site incident command (IC). The RTA's on-site IC will coordinate with the incident command established by outside emergency responders and become a resource to the incident commander, and will inform DRPT as the situation progresses.

##### **2.1.1 Investigator in charge (for DRPT investigation)**

###### **2.1.1.1 *Authority***

The DRPT IIC will initiate, coordinate and conduct an independent on-site investigation of accidents/incidents that meet SSPS investigation thresholds. DRPT may support the IIC with an accident investigation team.

###### **2.1.1.2 *Response***

Upon notification of an event meeting SSPS investigation thresholds, the IIC will respond to the scene when practical. He or she will also be the point of contact/communication with the RTA.

###### **2.1.1.3 *Coordination with incident command***

The IIC will coordinate with the RTA's on-site IC.

###### **2.1.1.4 *Securing the scene***

When possible and if not in conflict with any authority having jurisdiction (AHJ), the IIC will ensure the scene is secured in order to preserve site conditions and evidence to ensure accurate data development. This includes the ability to detain RTA equipment for investigative purposes by the SSO PM.



### **2.1.2 Coordination and provision of technical assistance/expertise**

#### **2.1.3 IIC (for DRPT investigation)**

The DRPT IIC will coordinate with the IC and other DRPT-contracted personnel to obtain, as needed, technical assistance/expertise in conducting required post-event assessments of vehicles, infrastructures, physical plant and/or equipment.

#### **2.1.4 Incident command (IC)**

If the DRPT IIC requests technical assistance/expertise, he or she will ensure that the IC makes the required technical assets available and deploys them to the scene in a timely manner. The DRPT IIC should ensure that tests are completed in a timely manner.

#### **2.1.5 Investigation committee**

Consideration will be given to the formation of a multifunctional investigation committee consisting of operations, mechanical, engineering and safety personnel under the leadership of the DRPT IIC.

#### **2.1.6 Technical assistance content**

Examples of technical assistance/expertise include, as applicable, inspection, testing and operational assessment of the following:

- Signals
- Track
- Power
- Communications
- Vehicle and equipment

## **3 Accident On-Site Data Development**

DRPT's IIC has three objectives for data development when initially responding to an accident scene:

- To preserve short-term and long-term physical evidence.
- To develop a preliminary sequence of events to determine what happened.
- To identify employees, passengers and other eyewitnesses to obtain preliminary statements and contact information.

Once an event occurs, short-term information becomes quickly perishable as the scene is recovered (e.g., equipment or obstructions are moved or rearranged, equipment controls are repositioned, witnesses "disappear," etc.) The primary task of on-site data collection is to prioritize the retrieval of such perishable information.



### **3.1 Initially photographing the scene**

Upon arrival on the accident scene, the DRPT IIC will arrange to have the scene photographed as soon as possible from a panoramic view, preferably before the accident scene is disturbed. This panorama should include camera photographic shots of the involved vehicle(s) in full view; nearby infrastructure features; and any evident significant obstructions, objects or conditions. Accident scene photographs should be taken using a “four-point compass” method. The entire scene should be photographed from multiple vantage points. The photographer should attempt to provide sufficient depth of field to show relative positioning of objects and subjects for later comparison with diagrams.

### **3.2 Documenting general observational information**

#### **3.2.1 General information upon arrival**

DRPT personnel will document the following checklist items:

- Location
- Day and date of occurrence
- Time of occurrence
- Time of arrival of DRPT IIC, supervisory staff and responders
- Visibility (dawn, day, dusk, dark)
- Weather (clear, cloudy, rainy, foggy, snowing, sleeting)
- Approximate temperature

#### **3.2.2 Eyewitness information**

DRPT personnel will obtain eyewitness information as quickly as possible. Information should include the following:

- Name, address telephone number
- Witness category (employee, passenger, bystander)
- Status of witness (observer or principal involved in accident)
- Brief description or account of what was or was not observed

### **3.3 Documenting vehicle and infrastructure factors and conditions**

#### **3.3.1 Vehicle condition at scene**

DRPT personnel will document the damage and condition of the vehicle(s), including monetary damage estimate. Checklist items will include the following, as applicable:

- Car-body condition (visible damage)



- Positions of all operator controls (controller and brake handles, headlight and other switches, air gauge readings, etc.)
- Wheels/axles/trucks/sanders
- Brake systems (friction, electric [dynamic], track)
- Door positions or other entry/exit location conditions
- Headlights, marker lights, indicator lights status

### **3.3.2 Vehicle dynamics**

DRPT personnel will document evidence relative to vehicle travel/speed to include, as a minimum, the following:

- Ensure event log data (where in service) is secured.
- Identify wheel marks on track.
- Identify evidence of sanding.
- Identify evidence indicating the area of contact/collision.
- Determine line-of-sight distances.
- Ensure arrangement to secure recorded communication data.

### **3.3.3 Infrastructure and environmental conditions at scene**

DRPT personnel will document the damage and condition of the infrastructure and environmental conditions, including a monetary damage estimate. Checklist items will include the following:

- Damage (observable) to track, signals, bridges, structures, buildings other infrastructure equipment or machinery
- Damage (observable) to crossing protection apparatus, if relevant
- Roadway approaches and visible pedestrian approaches (unauthorized or otherwise), if relevant
- Evidence (observable) of recent environmental alteration (washout, landslide, etc.)
- Evidence (observable) of recent miscreant alteration (vandalism)
- Point of derailment, collision or other incident

## **3.4 Diagramming and measuring the scene**

### **3.4.1 Diagramming**

DRPT personnel will sketch the scene, as appropriate, regarding the relative location of track(s), vehicle(s), signals, equipment, apparatus, buildings, bridges and other structures. Sketched will include noteworthy landmark features, such as roadways, waterways, pathways, flora, etc. Diagram alignment should be relative to geographic north.



### **3.4.2 Measuring**

DRPT personnel will indelibly mark points of reference in the field (e.g., paint or chalk markings), and document correlation of points of reference with resting positions of objects or subjects, using feet as a standard unit of measure.

### **3.4.3 Photographing specific circumstances**

DRPT personnel will arrange to have specific objects or subjects photographed as soon as possible from both normal periphery and close-up views, preferably before the accident scene is disturbed. The photographer should attempt to ensure appropriate depth of field to sufficiently record subject material. These photographs will attempt to include, as a minimum, the following:

- Each vehicle involved, exterior four sides, including number
- Each vehicle involved, interior compartment
- Each vehicle involved, operating control compartment
- Resting position of wheels if off track, including evidence of sanding
- All visible points of vehicle damage
- Evidence of wheel marks on rail
- All visible points of infrastructure damage
- Any visibly evident contributing obstructions, objects, or conditions
- Position of casualties, if stationary
- Any other subject that appears out of the ordinary

## **3.5 Casualty factors**

DRPT personnel will document the current status of all known casualties, including the following:

- Injuries – total number, personal information (if possible)
- Fatalities – total number, personal information (if possible)
- Identification of responder units that treated or transported casualties
- Identification of hospitals where casualties were transported

## **3.6 Toxicological factors**

The RTA is mandated by 49 CFR Part 655, “Prevention of Alcohol Misuse and Prohibited Drug Use in Transit Operations,” to conduct toxicological testing based upon regulatory requirements, collective bargaining agreements or standard policy. DRPT will ensure RTA field supervisory personnel making determinations meet qualification standards.



### **3.6.1 Identify if testing is required**

DRPT will determine if event factors meet criteria for drug and alcohol testing, and which employees, if any, are subject to testing based upon the criteria.

### **3.6.2 Authority and type of test**

DRPT personnel will identify the authorization to conduct the test and the type of test that is required. Authorization and types include the following:

- FTA (for cause, post-accident)
- FRA (for cause, post-accident)
- State safety oversight agency
- RTA (for cause, post-accident)
- Local or regional police

## **4 Accident Off-Site Data Development**

Once the accident scene has been recovered, the DRPT IIC has three objectives for data development:

- To collect remaining applicable non-perishable data.
- To conduct interim research and analysis of all collected data to date to reconstruct the event.
- To determine probable cause and contributing factors.

In the aftermath of an accident, long-term information that is nonperishable must be collected (e.g., operational speeds and conditions, maintenance and inspection records, damage estimates, etc.). The primary task of off-site data collection is to coordinate documentation to support evaluation of system, vehicle, and employee performance.

## **5 Coordination and Provision of Technical Assistance/Expertise**

DRPT personnel will coordinate needed post-accident research and analysis with all support departments and independent outside agencies, and arrange for providing specialized technical support within the respective discipline(s) and/or departments.

### **5.1 Vehicle and component performance**

#### **5.1.1 Inspections/tests**

DRPT personnel will conduct and/or document post-accident inspections/tests on vehicles as needed to determine if pre-existing conditions contributed to the accident.



Applicable components to be tested should include, as a minimum, the following:

- Operator controls
- Wheels/axles/trucks/sanders
- Braking systems friction, electric (dynamic), track
- On-board signal/speed control systems
- Communication system
- Lights
- Whistle/horn/gong

#### **5.1.2 Engineering specifications**

DRPT personnel will obtain all applicable engineering specifications and drawings, as applicable.

#### **5.1.3 Maintenance history**

DRPT personnel will review prior maintenance history of vehicle or components to determine if any significant conditions or performance levels existed prior to the accident, identify relevant protocols and recommended frequency. DRPT personnel will also identify activities performed or omitted, the dates and by whom they were performed.

#### **5.1.4 Data comparison**

DRPT personnel will compare systems performance data (inspections/tests, maintenance history) vs. prescribed engineering limits/specifications to determine if there were any contributing factors to the accident.

#### **5.1.5 Damage costs**

DRPT personnel will verify vehicle damage and repair costs.

### **5.2 Vehicle dynamics**

#### **5.2.1 Event log data**

DRPT personnel will review event log data to determine actual vehicle performance prior to and at the time of the event.

#### **5.2.2 Communication data**

DRPT personnel will review recorded radio or other communication data to determine if the flow of information is of significance.



### **5.3 Infrastructure system performance**

#### **5.3.1 Inspections/tests**

DRPT personnel will conduct and/or document timely post-accident inspections/tests on infrastructure as needed to determine if pre-existing conditions contributed to the accident. Infrastructure components to be tested should include, as a minimum or as applicable, the following:

- Track structure
- Traction power system
- Signal systems
- Routing systems
- Buildings and other structures
- Bridges
- Grade crossing protection apparatus
- Other equipment or machinery

#### **5.3.2 Event log data**

DRPT will review recovered data from any off-vehicle event recorders, such as signal system event recorders or other software driven records systems.

#### **5.3.3 Engineering specifications**

DRPT personnel will obtain all applicable engineering specifications and drawings.

#### **5.3.4 Maintenance history**

DRPT personnel will review prior maintenance history of systems to determine if any significant conditions or performance levels existed prior to the accident, and identify relevant protocols and recommended frequency. Identify activities performed or omitted, and the dates and by whom they were performed.

#### **5.3.5 Data comparison**

DRPT personnel will compare systems performance data (inspections/tests, maintenance history) vs. prescribed engineering limits/specifications to determine if there were any contributing factors to the accident.

#### **5.3.6 Damage costs**

DRPT personnel will verify infrastructure damage and repair costs.



## **5.4 Operational conditions and factors**

### **5.4.1 RTA operating instructions**

DRPT personnel will identify all applicable transit operating instructions at the location of accident. These include, but are not limited to, the following:

- Maximum authorized speed and speed restrictions
- Operating signs and locations
- Wayside signal locations and aspects capable of being displayed
- Bulletins or other special operating orders in effect at time of accident
- Automatic signal systems in effect (train control, cab signals, interlockings, automatic block, etc.)
- Any special operating conditions

### **5.4.2 Other operating instructions**

DRPT personnel will obtain and review applicable federal and state rules/regulations to determine compliance and effect on accident dynamics. As applicable, these include the following:

- Motor Vehicle Code
- Operating standards and practices
- Equipment standards
- Qualification/certification level requirements
- Inspection/maintenance standards
- Safety standards and practices

## **5.5 Interviews and outside reports**

### **5.5.1 Primary interviews**

DRPT personnel will conduct detailed face-to-face interviews as needed to determine the sequence of events leading up to and at the time of the accident. If possible, tape record the interview and obtain the interviewee's signature. Interviews should include, as a minimum or as applicable:

- Crew members
- Other employees directly or indirectly involved in the sequence of events
- Non-employee accident principals
- Passengers
- Bystander witnesses



### **5.5.2 Secondary interviews**

DRPT personnel will obtain any interview data conducted by other independent sources.

### **5.5.3 Supervisory reports**

DRPT personnel will obtain applicable supervisory reports of investigation.

### **5.5.4 Outside agency reports**

DRPT personnel will obtain applicable reports of investigation prepared by outside agencies and police.

## **5.6 Documenting human factors**

### **5.6.1 Employee records**

DRPT will review employee records for performance history or incidents relating to accident dynamics. These records should include, but are not limited to, the following:

- Operating and safety practices compliance
- Qualification/certification levels and experience
- Training and continuing education history
- Accident history
- Toxicological and medical history
- Attendance/discipline history

### **5.6.2 Fatigue factors**

DRPT will review and document employee hours of service before accident. This should include the following:

- Time employee reported for duty
- Elapsed time from on-duty time until time of accident
- Break periods before accident
- Available off-duty hours before reporting for assignment
- Number of consecutive days worked prior to day of accident
- Nature of off-duty activity prior to accident

### **5.6.3 Fitness for duty**

DRPT will review and document the employee's fitness for duty. This should include the following:



- Visual acuity
- Pre-existing medical conditions
- Consumption of prescription/non-prescription medication

#### **5.6.4 Employee performance**

DRPT personnel will consider all aspects of employee performance comparative to operating conditions, vehicle and infrastructure conditions, and human physical limitations. Compare research data to event log and communication data to determine performance level.

### **5.7 Follow-up casualty factors**

#### **5.7.1 Contacting hospitals and verifying casualties**

DRPT personnel will contact hospitals to verify casualties and obtain the following:

- Number
- Identities
- Severity (injuries vs. fatalities, nature of injuries); include medical examiner reports

#### **5.7.2 Trespasser events**

DRPT personnel will conduct additional research for trespasser events and review the following:

- Police reports related to indications of suicide or foul play
- Medical Examiner toxicological reports

#### **5.7.3 Potential injury dynamics/survival factors**

DRPT personnel will document vehicle, infrastructure or operating conditions that could have contributed to or increased severity of casualties.

### **5.8 Follow-up toxicological factors**

#### **5.8.1 Testing results**

DRPT personnel will obtain results of post-accident toxicological testing.



### **5.8.2 Testing determination**

DRPT personnel will obtain determination of toxicological significance, if available.

## **5.9 Reconstruction**

As considered relevant, DRPT personnel will reconstruct the accident dynamics and sequence of events based upon all data developed from on-site investigation and off-site research. DRPT personnel will establish facts that were contributory to the accident. Fact-finding should include, as a minimum, the following categories:

- Actual vehicle performance
- Actual infrastructure performance
- Actual employee performance
- Mathematical calculations
- Scale drawings/diagrams
- Photographic evidence

## **5.10 Analysis**

When all readily obtainable information is assembled, the DRPT IIC will ensure that all existing evidence is evaluated and make a general determination as to the contributing factors and probable cause of the accident. As applicable, the following information should be included:

- DRPT IIC's primary report
- All other supervisor's individual reports
- Interview reports
- Technical reports (vehicle, infrastructure, other)
- Outside agency reports
- Data contained on records, if applicable
- Hand-written statements
- Event log data
- Radio/communication tapes and/or transcripts
- Maps, drawings, or diagrams
- Photographs or videos

The DRPT IIC will keep in mind that the investigation might not have reached the final stage. The DRPT IIC understands that future evidence may surface that could change the determination of probable cause.



## **6 Preparing reports and recommendations**

### **6.1 Investigator in charge**

The DRPT IIC will prepare a summary report detailing the data and analysis to support a determination of cause and recommended corrective action, where needed.

### **6.2 Draft report**

A draft report will be completed in a time period to be determined by DRPT.

### **6.3 Accident report**

As a minimum, the DRPT investigation report will include the following sections:

- Executive Summary
- Sequence of events
- Prior to the event
- The event
- Subsequent to the event
- Findings/analysis
- Conclusions
- Probable cause
- Contributory causes
- Recommendations

### **6.4 Evidence retention**

DRPT will establish a protocol to retain, secure and store physical evidence and documentation developed pursuant to investigations for future criminal, tort or AHJ action. The protocol should attempt to include, as a minimum, the following:

- Chain of custody procedure
- Validation of photographs/videotapes and control center tapes
- Physical evidence retention procedure
- Procedure for destructive/nondestructive testing

## **7 Follow-up**

### **7.1 Implementing recommendations**

DRPT will coordinate with affected departments to draft CAPs for implementing recommendations developed after an accident investigation.



## **7.2 CAP summary**

DRPT will coordinate with the RTA in preparing a CAP Summary for all recommendations developed after the accident investigation.

## **7.3 CAP information**

DRPT will ensure the CAP includes the following information:

- The recommendation and plan for correction.
- Activity to meet objectives of the plan.
- Responsible department/individual for plan implementation and task activity.
- Scheduled completion dates.
- Estimated cost.
- Follow-up

DRPT will also ensure that the recommendation is implemented, and does not result in other safety issues.

## **7.4 Periodic reporting**

DRPT will prepare an internal status report of CAP activity and completion status. DRPT will have a follow-up review to check that the corrective actions have been implemented.